

Department of Energy

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AUG 26 1988

Ms. Christine O. Gregoire, Director
Washington Department of Ecology
Mailstop PV-11
Olympia, Washington 98504-8711

Dear Ms. Gregoire:

SAFETY AND HEALTH REPORT FOR THE DEPARTMENT OF ENERGY DEFENSE COMPLEX

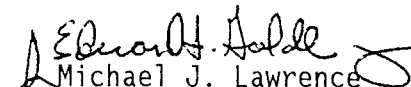
The enclosed information has been compiled in response to your request on July 14, 1988, for additional information regarding Hanford Site clean-up costs presented in the Environment, Safety and Health Report for the Department of Energy Defense Complex (the "Glenn Report"). This information includes:

- o A cost summary for the environmental remediation activities at the Hanford Site;
- o A summary table of scope and costs for the Glenn Report and for the preferred alternative as described in the December 1987, Environmental Impact Statement entitled "Disposal of Hanford Defense High-Level, Transuranic, and Tank Wastes" (HDW-EIS); and
- o A summary of Appendix B of the Glenn Report with relevant questions and answers.

Please feel free to call me if you need additional information.

Sincerely,

ERD:CRD


Michael J. Lawrence
Manager

Enclosures:

1. Glenn Report Cost Summary-Hanford Site
2. Table of Scope and Costs for the Glenn Report and for the Preferred Alternative in the HDW-EIS
3. Summary of Appendix B of the Glenn Report w/Questions and Answers

cc w/encls:
R. E. Lerch, WHC
Hon. Shirley Hankins



GLENN REPORT COST SUMMARY - HANFORD SITE

Enclosure 1

| | Low | Expected | High |
|-----------------------------|-------|----------|--------|
| Inactive Site Clean-up Cost | ~\$4B | ~\$20B | ~\$35B |
| SST Clean-up (from HDW-EIS) | ~\$1B | ~\$7B | ~\$11B |
| TOTAL | ~\$5B | ~\$27B | ~\$46B |

NOTE: No Decontamination and Decommissioning included in above. Total cost is expected to exceed \$1B.

1. Assumptions Summary Inactive Site Cost

Lower Bound Case

- Characterize ~700 sites - ~\$2.0B
- Remedial Action ~500 sites ~\$2.0B
- Primarily install covers with minimal in-place stabilization ~\$4.0B

NOTE: The lower bound case was developed, but not included in the Glenn Report

Expected Case

- Characterize ~700 sites ~\$2.0B
- 20% of ~500 sites to be remediated would be retrieved, treated and disposed ~\$10.0B
- 20% of ~500 sites would be stabilized in-place and covered ~\$6.0B
- 60% of ~500 sites would only be covered ~\$2.0B
- ~\$20.0B

Upper Bound Case

- Characterize ~700 sites ~\$2.0B
- Remedial Action at ~500 sites ~\$33.0B
- Primarily retrieve wastes, treat and dispose; incineration would be primary method of treatment ~\$35.0B

2. SST

Lower Bound Case

- Stabilize in-place ~\$1.0B

Expected Case

- 1/2 tanks - contents removed, 1/2 tanks - stabilize in-place ~\$7.0B

Upper Bound Case

- Remove 95% of contents (stabilize tanks, leaks and residues in-place) ~\$11.0B

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SUMMARY TABLE OF SCOPE AND COSTS
FOR THE GLENN REPORT AND THE
PREFERRED ALTERNATIVE OF THE HDW-EIS

| <u>SCOPE</u> | <u>HDW-EIS COST⁽¹⁾ (LOW / HIGH)</u> | <u>GLENN REPORT COSTS⁽²⁾ (EXPECTED/ HIGH)</u> |
|---|--|--|
| Existing Double-Shell Tank Wastes | 1,300 | |
| Future Double-Shell Tank Wastes | 1,300 | |
| Strontium and Cesium Capsules | 210 | |
| Retrievably Stored and Newly Generated Transuranic Wastes | 190 | |
| Single-Shell Tank Wastes | 700/11,300 | 7,000/11,000 |
| Transuranic-Contaminated Soil Sites | 68/470 | |
| Pre-1970 Buried Suspect Transuranic-Contaminated Solid Wastes | 170/1,600 | (3) |
| Inactive Site Characterization and Remediation | | 20,000/35,000 ⁽³⁾ |
| Safety and Health | | 30/130 |
| TOTAL (rounded) | <u>\$3,900/16,400</u> | <u>\$27,030/46,130</u> |

(1) HDW-EIS COSTS ARE IN MILLIONS OF 1987 DOLLARS. VALUES ARE ROUNDED.

(2) GLENN REPORT REMEDIAL ACTION AND HEALTH AND SAFETY COSTS ARE IN MILLIONS OF 1990 DOLLARS. VALUES ARE ROUNDED.

(3) GLENN REPORT INACTIVE SITE CHARACTERIZATION AND REMEDIATION COSTS INCLUDE PRE-1970 BURIED SUSPECT TRU-CONTAMINATED SOLID WASTES.

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Summary of
Environment, Safety and Health (ES&H) Report
for the U.S. Department of Energy's Defense Complex

Introduction

The Environment, Safety and Health Report for the U.S. Department of Energy's Defense Complex is DOE's response to a Congressional request from Senator John Glenn, D-Ohio, to outline the work, schedule and costs required to bring DOE sites into environmental compliance. The report was released to Congress on July 1, 1988. This following is a summarization of Appendix B of the report, which covers the Hanford Site in Washington state. Annual revisions to the report are expected. Completion of the activities outlined in Appendix B would bring the Hanford Site into compliance with all applicable environmental laws and would remediate past-practice waste sites.

Background

Appendix B is divided into three major sections.

Section 1, Site Mission, is a brief discussion of Hanford's past and present Defense Production Operations.

Section 2, Key Areas of Focus, summarizes the major work in each of six major areas of Hanford activity. The six areas are Resource Conservation and Recovery Act (RCRA) Compliance, Environmental Restoration, Alternatives to Soil Column Disposal, Facility Safety Upgrades, N Reactor Safety Upgrades and Nuclear Safety Analysis.

Section 3, ES&H Resource Projections, breaks down annual costs from 1988-1995 for corrective actions and a base ES&H program, and gives total costs to complete corrective actions after 1995.

Summary

Hanford's comprehensive response to the Senator's request is designed to achieve compliance with the letter and spirit of all existing environmental laws.

The projected 1988-1995 costs for corrective action and the base program are \$2.07 billion for environmental activities and \$420 million for safety and health activities.

For the post-1995 period, costs are projected at two levels, \$27 billion for the expected level of remediation, and \$46 billion for the high level.

- o Expected level -- Assumes completion of characterization of 700 of 1200 inactive waste sites and remediation on about 500 of these 700 sites with removal and treatment of some wastes, in-place treatment of others, and/or capping of the sites. An estimated 700 sites are estimated to not require significant remedial action, although that number could change following characterization. There are 149 single-

shell tanks containing mostly solidified radioactive and chemical wastes. Waste from about half of those tanks would be completely removed, processed and shipped to the national repository. The remaining wastes and the tanks would be stabilized in place and covered by barriers and markers. Completion of work on inactive sites is expected about the year 2025. Waste sites would be cleaned to allow unrestricted surface access to the areas, though at this time, DOE has no plans to return any of the site back to public use.

- o High Level -- Assumes removal of wastes, thermal treatment (incineration) and disposal of residue in facilities with disposal permits. Very little waste would be left in place. Removal, processing and deep geologic disposal of single-shell tank waste is included.

As with the expected level, waste sites would be cleaned to allow unrestricted surface access to the areas. However, fewer restrictions would be placed on future excavation and drilling.

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GLENN REPORT
QUESTIONS AND ANSWERS

Question: What is the basis for Hanford's numbers?

Answer: A portion of the costs are based on the Hanford Defense Waste-Environmental Impact Statement, which went through extensive public review. Other costs not addressed in the EIS are based on a comprehensive assessment of the Hanford Site against a set of standard cost parameters. These were part of a study performed by an experienced contractor in support of DOE. This contractor was very familiar with Environmental Protection Agency and Washington hazardous waste regulations. In addition, these costs were reviewed by Westinghouse Hanford Company, U.S. Department of Energy, Richland Operations Office and a second independent consultant.

Question: How was the \$27 billion expected level cost value developed, in detail?

Answer: The following information was provided based on a study by an independent consultant on Hanford's inactive waste sites.

- o The total number of sites was considered to be approximately 1200.
- o The screening process used by the consultant in the report had reduced the number of sites they evaluated to be characterized to approximately 60% of the total. The average cost for characterization was assumed to be approximately \$3 million per site. Therefore, the total for characterization is about \$2,000 million (\$3 million for 700 sites).
- o The next step in the screening had reduced the number of sites to be remediated to approximately 40% of the total (500 sites).
- o Of the 500 sites to be remediated, 20% (100 sites) were considered to require excavation. This number was chosen since the consultants study contained 81 sites ranked above 28.5 on the Hazard Ranking System (HRS) and several hundred additional sites have been identified since the study. The average cost associated with the excavation of sites was approximately \$100 million per site. Therefore, the total for excavation is \$10,000 million.
- o Of the 500 sites, another 20% (100) were estimated to require in place treatment (grouting, vitrification, soil flushing). The average cost associated with the in place treatments was approximately \$60 million per site. Therefore, the total for in place treatment is \$6,000 million.

- o The remaining 300 sites were considered to require some type of cap or barrier be placed over them. The average cost associated with capping was approximately \$3 million per site. Therefore, the total for capping is \$1,000 million.
- o The expected total cost for inactive waste sites clean-up is approximately \$20,000 million.
- o The HDW-EIS presents the total cost of single-shell tank remediation at \$11,000 million for removal of about 95% of contents. An expected value was arbitrarily set at \$7,000 million for about half of the tanks plus some fixed costs. The total expected clean-up cost is therefore \$27 billion.

Question: What about the \$46 billion high-level cost?

Answer: This figure was developed similarly to the expected-level.

- o Characterization costs for inactive sites are the same at \$2,000 million.
- o Of the 500 inactive sites to be remediated, most were assumed to require excavation and the remainder in-place treatment, for a total cost of about \$33,000 million.
- o The full \$11,000 million single-shell tank cost was used. This gives a total of \$46 billion for a high-level cost.

Question: What costs are not included in these values?

Answer: Decontamination and decommissioning costs for current and future retired facilities are not included in the Glenn Report. This cost is expected to eventually exceed \$1 billion at Hanford.

Interim operational costs are also not included, nor are costs for any modernization of current defense facilities or any new facilities, such as the Hanford Waste Vittrification Plant. Costs for disposal of transuranic or double-shell tank wastes are not included in these costs either.

Question: Is this much money needed?

Answer: We believe this is the amount needed to bring the site into compliance with federal and state environmental regulations. These regulations were not necessarily promulgated to address sites such as Hanford. The cost to provide a relative health risk similar to that found in nature from natural radiation would be much lower.

Question: What do you mean by "cleaning up to allow surface access." Do you intend to release part or all of the site for public use/development.

Answer: DOE currently does not plan to release any of the Hanford Site for future access. We have used as a basis for establishing clean-up costs that all sites would have no surface contamination or radiation exposure above natural background. This means that workers or inadvertent visitors could safely walk on the sites, even for an extended length of time. We have no plans to allow farming or other development activities over the site.

Question: Does this \$46 billion bring the site back to its original pristine condition?

Answer: No. Much of the waste is stabilized in place or consolidated in an on-site disposal facility. Also, decommissioning of facilities (PUREX, FFTF, for example) is not covered under this scope.

Question: What happens to the single-shell tanks under the two alternatives?

Answer: Under the "high" case, the geologic disposal option of the HDW-EIS for single-shell tanks is implemented. This means that 95% or more of the waste in the tanks is removed, processed with the high-level fraction going to the commercial deep-geologic repository and the low-level fraction stabilized on-site. The emptied tanks are then backfilled and covered with protective barriers and markers. This costs \$11 billion.

Under the "expected" case, we arbitrarily assumed half of the 149 single-shell tanks are treated as in the geologic disposal option and the other half would be stabilized in place (with protective barriers and markers). This costs roughly \$7 billion, as there are fixed capital costs as well as processing costs. We are in the process of gathering data and will be working with the State, Environmental Protection Agency and Nuclear Regulatory Commission to develop criteria as to what single-shell tank waste is acceptable to leave near surface and what must be retrieved. We do not have this data today, but we did not wish to assume either extreme at this time. No decision has been made or will be made until additional data is available and agency and public input has been obtained through an Environmental Impact Statement.

Question: Why are the Glenn Report costs different from those in the HDW-EIS?

Answer: The costs in each document cover different scope and are therefore not directly comparable. The HDW-EIS includes categories for disposal of double-shell tank waste, cesium and strontium capsules, and transuranic waste. The Glenn Report does not include all of these costs but does include remedial actions on inactive sites (most of which are not covered in the HDW-EIS) and safety and health actions where the HDW-EIS does not. Single-shell tank remediation is the major area of overlap between the two plans.

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**SAFETY AND HEALTH REPORT FOR THE DEPARTMENT OF ENERGY
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